N.A.C.A. BULLETIN

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VOL. XXX, NO. 23 AUGUST 1, 1949

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This *Bulletin* is published semimonthly by the National Association of Cost Accountants, 385 Madison Ave., New York 17, N. Y. Subscription price, $10 per year. Entered at the Post Office, New York, N. Y. as second-class matter August 28, 1925, under the Act of March 3, 1879.

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COST ACCOUNTANTS
August 1, 1949

INTERNAL AUDIT OF COST FUNCTIONS—PROCEDURES FOR AUDITING STANDARD COSTS

by EARL A. GREEN,
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If costs as developed and reported under procedures in force are to guide management, it is apparent that no pains should be spared to make sure that their usefulness is not impaired by errors or inadequacies in origin, transmission, or compilation. The internal audit program followed in the company whose procedures are reported in the present article provides in detail for the audit of cost functions, with stress on the soundness of standard costs.

IF YOU are still using your internal auditor solely to check the accuracy of accounting records and the adequacy of internal control for the prevention of fraud, you are missing a real opportunity. The objective of internal auditing, stated in broad terms, is to assist management in achieving the most efficient and effective administration of the operations of the organization. This is not theory. It is actual practice. One of the ways in which internal auditing may move toward this objective is through the examination of cost functions. We do this in the Armstrong Cork Company. This paper is an account of actual practice and describes the audit of cost functions, with detailed material on the audit of standard costs, as practiced in our company. The subject is covered here in three parts:

1. Why we audit cost functions.
2. How we audit cost functions (audit of standard costs presented as illustrative material).
3. How we report the results of our audit to management.

In the first place, why do we think the internal audit of cost functions is important? Well, information secured through the operation of a company's cost system is used by the management to control operations and for planning and policy making. From this it is clear that cost information is vitally important to management. But, suppose that this information is not accurate or that it is pre-

sented poorly. Management may make the wrong decision. This may cause embarrassment or, more important, it may seriously affect the company's earnings and financial position. Surely the implication is clear. Management must be assured that the cost information it receives is comprehensive and reliable. How is it to receive this assurance?

If the internal auditing department is alert to its full responsibility, this question need not be asked. Internal auditing is intended to serve as a tool of management. There are many ways in which it can do this, but one of the internal auditor's greatest opportunities to serve management lies in the examination of his company's cost functions. We recognize this opportunity and we provide for the examination of cost functions in our program of regular audits.

Schedule for Auditing of Cost Functions

How do we audit the company's cost functions? Certain of our cost functions are performed in the home office cost department. The rest are carried on in the plant controller's section at each of our eighteen plants. The home office cost department functions are directed by the chief cost accountant who reports to the office of the vice president and controller. The cost functions at each plant are directed by the plant controller who is directly responsible to the plant manager and functionally responsible to the company's vice president and controller. We audit the cost functions at the home office and those at the plants.

Home office cost functions are examined as individual audit projects over the year. For example, standard rates for selling expense and administrative expense may be examined in January, "lifo" inventory records in June, and control reports in August. Our program of regular audits for 1949 includes twenty examinations that deal with cost or closely related functions. Most of the home office cost functions are examined only once during the year in this way.

When we audit at a plant, we examine all cost accounting and related functions—except inventory taking for year end closing purposes—in one visit. We make a separate visit to observe and appraise the organization for and the taking and listing of the inventory used for year end closing.

We do not visit all plants each year. For the audit of cost functions, we visit the Lancaster floor plant and the Pittsburgh plant

each year. We do this because these are our two largest plants and comprise a substantial portion of our total plant investment. The other sixteen plants are visited over a cycle of two years unless unsatisfactory audit findings, organization changes, or other significant factors require that an examination be repeated the following year. When we plan our visits to plants to observe the taking of inventories for year end closings, we give first consideration to plants where substantial inventory gains or losses were experienced at the time of the previous inventory. Otherwise, we visit all plants over a cycle of two years for this purpose. Each year the plants not visited by the internal auditors are covered by our independent public accountants.

Of course, the ability of the internal auditor to properly audit cost functions can be questioned. We thought about that, too, when we included the audit of cost functions in our regular audit program. We decided that a staff auditor who has had a cost accounting background is better equipped to examine and appraise cost functions than one who has not had this training and experience. So, as a part of our training program, we select men in the home office cost department and in the plant controller's sections who appear to possess the qualities and potential required for effective internal auditing. We promote these men to the auditing department. Nearly half of our present staff have had experience in the home office cost department or in one or more plant controller's sections.

We use written audit procedures for our examinations of cost functions. We do this to provide an orderly approach, to guard against the omission of important audit steps, and to reduce supervisory effort. These written audit procedures will usually provide for adequate audit coverage. Nevertheless, it is still the staff auditor's responsibility to exercise initiative in the conduct of his examination. He must recognize the need for and take any additional audit steps that will increase the effectiveness of the examination.

What Is Involved in the Audit of Standard Costs

The compass of a single article is not sufficiently broad to permit a description of the audit procedure for the examination of each cost function. For this reason, the procedures used for the examination of the development of standard manufacturing costs and their application in the monthly cost closing have been selected for discussion here. This will cover a large part of the examination of

cost functions at a plant. Moreover, the procedure used is typical of that employed in all of our examinations of cost functions.

The examination of the development of standard manufacturing costs and their application in the monthly cost closing is made in five parts. It covers: (1) development of the standards, (2) securing and reporting of daily operating data, (3) summarization of daily plant reports, (4) application of standard cost rates, and (5) preparation of monthly closing entries. These subjects will be taken up in the order given.

Development of the Standards

Standard costs for raw materials, work in process, and finished products are developed from properly approved data submitted by industrial engineers, plant engineers, plant laboratories, the purchasing department, and the home office cost department. The standards are built at the plant under the direction of the plant controller. Our audit objective in this part of the examination is to determine whether or not the standards are soundly conceived, mathematically correct, and arranged in a manner that will facilitate their use.

To accomplish this, the auditor reviews and appraises the basic data used in building the standards (e.g., labor standards furnished by the industrial engineers, standard material formulas obtained from the plant laboratory, etc.), the work sheets prepared in their development, and the forms on which the final details of the standard cost rates are entered (i.e., the standard cost sheets). In addition, the auditor surveys plant operations and questions foremen, superintendents, industrial and general plant engineers, and personnel in the laboratory and the plant controller's section about the basic data, operating methods, and cost accounting techniques used in constructing standards. In this way, answers are obtained to the following key questions:

1. Were the basic data used in building the standards secured from the proper sources in writing and were they approved by authorized personnel?
2. Do the material purchase prices, labor rates, formulas, and operating data apply to the period for which the standards are intended to be in effect?
3. Was this information clear and concise and properly arranged so that errors due to misinterpretation could be avoided when it was used in building the standards?

4. Was the information in fact used correctly in building the standards?
5. Have sound cost accounting methods and logical reasoning been used in building the standards?
6. Have proper allowances been made in the standards for such items as manufactured scrap, shrinkage, and by-product values?
7. Do the standards include the costs of all operations performed on the product in the course of its manufacture?
8. Are the standards correct mathematically?
9. Do the personnel employed in building the standards appear to be qualified for this work?
10. Do the headings on the standard cost sheets seem sufficiently descriptive?
11. Does the design of the standard cost sheets permit the cost of a product at any stage of completion to be determined quickly?
12. Are the standard cost sheets kept in appropriate binders and are they indexed in a manner which facilitates reference thereto?
13. Are these records protected from reference by unauthorized persons?
14. Were the finished standards reviewed and appraised from the standpoint of adequacy and accuracy by the plant controller prior to their use?

Securing and Reporting of Daily Operating Data

By operating data we mean the data collected at and reported from points of origin in the productive and service operations of the plant. Examples are time reports, labor reports, receiving reports, material tickets, material utilization reports, production and scrap reports, details of shipments, and physical counts taken of materials and products. These reports are prepared and sent to the plant controller's section on a daily basis in most instances. Here the auditor's purpose is to appraise the adequacy of these daily plant reports and the accuracy with which they are prepared.

For these purposes, the auditor visits the plant operations to observe the flow of work and questions foremen and the people who prepare the reports. He reviews the methods by which quantities or weights are obtained and appraises the forms on which the data are reported. In addition, he tests the accuracy and legibility

of the reports. In this manner he obtains the information he needs to judge whether or not:

1. The data are obtained at and reported from the most logical and/or expedient points within each productive or service operation.
2. Appropriate mimeographed or printed forms are used for these daily reports.
3. The forms are being used properly and the data are entered thereon accurately and legibly.
4. Personnel responsible for preparing these reports appear to be sufficiently qualified from the standpoint of intelligence, capacity, accuracy, and interest, and whether or not they appear to receive adequate training and instructions.
5. Methods employed to obtain quantities or weights of materials and products are practical and conducive to accuracy; automatic counters are tested at reasonable intervals by plant engineers; estimates are made by qualified personnel.
6. Time-keeping procedures are satisfactory.
7. The reports are submitted promptly to the plant controller's section.
8. Proper consideration is given to such factors as thoroughness, accuracy, and ability to identify materials and products, when personnel are assigned to take physical inventories for monthly closings.
9. The plant controller or his assistant makes reasonably frequent visits to the production and service operations to observe current operating conditions and practices so that the need for changes in report forms or for the relocation of reporting points may be detected promptly.

Summarization of Daily Plant Reports

Certain of the daily reports, such as material and supply utilization reports, production and manufactured scrap reports, and details of shipments, are summarized monthly in the plant controller's section. This is done to facilitate the application of the standard cost rates and the computation of the standard cost values for monthly closings. The auditor is required to determine whether or not these summaries are adequate for monthly cost closings and, likewise, whether or not the daily plant reports have been sum-

marized correctly. In response to these requirements, the auditor does the following things:

1. He appraises the appropriateness of the forms used for the summarization of the daily plant reports:

   Are the headings clear?
   Do the forms provide sufficiently for dates, quantities, descriptions, unit cost rates, amounts, and accounting codes?
   Are the forms designed so that costs may be determined by operation or cost center? Can the monthly cost closing entries be prepared readily from the summaries?

2. He checks the accuracy of the summaries:

   Have the data shown on the daily plant reports been posted correctly to the summary forms?
   Have the quantities been summarized correctly?

3. He investigates the degree of supervisory test checking in effect:

   Does the plant controller or his assistant conduct periodic reviews and test checks of the work?
   Can some economical form of internal check be installed to control the accuracy of the work?

Application of Standard Unit Costs

Standard unit costs for raw materials, work in process, and finished products, are applied to the monthly summaries. This is done to obtain the standard value of material receipts, material usages, production of semifinished and finished products, manufactured scrap and by-products produced, and materials and products shipped. Some products are not manufactured or shipped frequently enough to justify summarization. Here, standard cost rates are applied to copies of factory orders or to other records. The standard cost values obtained by pricing and extending these summaries or other records serve as the basis for monthly closing entries. These values are used also in the preparation of monthly control reports such as purchasing profit or loss and commodity profit or loss. The auditor's objective here is to determine how accurately the standard unit costs have been applied and the values determined. To accomplish this, he examines the cost sum-

maries and related working papers for one or more monthly closings.

The investigation conducted by the internal auditor must be sufficient to provide the answers to the following questions:

1. Have the proper standards and accounting codes been applied to the summaries or other records?
2. Was any difficulty experienced in verifying the application of the standards because the description on the summary or other records did not agree with the description on the standard cost sheets?
3. Were the standard cost values computed accurately?
4. Do the individuals performing this function appear to have the proper technical ability and interest in the work?
5. Does the plant controller or his assistant conduct periodic test checks of the application of the standards, or is some form of internal check in use for this purpose?

Preparation of Monthly Closing Entries

Journal entries for monthly closings are prepared from the amounts and accounting codes shown on the cost summaries and forwarded to the home office cost department for review and approval by the chief cost accountant. Two sets of entries are prepared: in one set, the amounts and accounting codes are arranged so that the entries can be used to prepare the medium for posting the general ledger accounts; in the other set, the amounts and codes are arranged according to inventory control groupings, so that these entries may be used to post the inventory control records.

To appraise the propriety and accuracy of these monthly journal entries, the auditor must determine whether or not:

1. The proper accounting codes and amounts are shown on each entry.
2. The explanations on the entries are clear and complete.
3. Responsibility for the preparation of the entries has been assigned to someone with an adequate knowledge of plant operations, materials and products, and cost accounting procedure.
4. The plant controller reviews and approves the entries before they are forwarded to the home office cost department.

Reporting the Audit Results to Management

It is hoped that the immediately foregoing sections of this paper have given a fairly concrete idea of the responsibilities assumed by the internal audit staff in their review of standard cost construction and application. However, we have dealt principally with the particulars of the auditor's work in this connection. How do we report the results to management? How is management informed of what we have audited and what we have found? This is our most important task. We must inform management promptly and properly of what we have audited and of the audit findings.

At the conclusion of the examination and before he writes his formal report, the auditor in charge reviews with local management the scope of the examination, the audit findings, and his recommendations. By local management, I mean the chief cost accountant, in the case of cost department audits, and the plant manager and the plant controller if the audit is made at a plant. This plan has proven very effective for these reasons:

1. It permits the management to take corrective action promptly.
2. The management may disagree with certain of the conclusions drawn by the auditor from his findings. These matters can be discussed and an agreement reached before the auditor writes his report.
3. It gives management the opportunity to appraise and point out any weaknesses in the auditor's suggestions and recommendations. As a result, unsound ideas do not find their way into the audit report.
4. Controversy over statements made in the audit report is avoided.
5. Mention is made in the formal audit report of the review with local management. Because of this, top management does not have to contact the chief cost accountant or the plant manager to find out what action has been taken to correct unsatisfactory conditions.

After his review with the management at the location of the audit, the auditor discusses the scope and results of his examination with the chief auditor or his assistant. If the audit was made at a plant, the divisional cost accountant, who is functionally responsible for the cost accounting work at that plant, is invited to

attend the review. We do this to acquaint him promptly with any matters that he should follow up at the plant.

After these reviews, the auditor in charge of the examination prepares his formal audit report. The preparation of the audit report is probably the most important and the most difficult phase of the auditor's work. It represents one of the principal means by which management measures, not only the efficiency of its own operations, but also of the work done by the auditing department.

From the auditor's viewpoint, the report is his sales medium. It is through his reports that his technical skill is judged by management. The audit report should be a builder of good will. To accomplish this, it should state the facts fairly, courteously, and accurately. Undue emphasis on exceptions of a minor nature and the use of arbitrary or denunciatory statements must be avoided.

Earle H. Cunningham, General Auditor of General Motors Corporation, summed up the importance of the internal audit report very capably when he said in a talk given recently before the Philadelphia Chapter of the Institute of Internal Auditors, "Much skillful and constructive auditing is dissipated through poor reports and presentations."

About Report Writing and Distribution

We do not believe that it is possible to reduce report writing to formula, but we do believe that mastery of the following principles will assist greatly in the preparation of good audit reports:

1. Clarity
2. Conciseness
3. Proper arrangement
4. Grammatical correctness

Our audit reports are distributed as follows:

1. If the examination was made in the home office cost department, copies of the report are issued to the chief cost accountant, the cost section supervisor directly responsible for the cost function examined, the office of the vice president and controller, the company's public accountants, and any other executives or key personnel whose functions or interests tie in or are associated closely with the cost function examined.

2. If the examination was made at a plant, copies of the report go to the plant manager, the plant controller, the production manager, the divisional general manager, the office of the vice president and controller, and the company's public accountants.

From this you will note that our reports go to various levels of management and that these levels range from section supervisors to company officers. This has an important bearing on our report writing. Why? Because, if we think objectively, it is obvious that, with such a variation in degree of responsibility, there must be a corresponding variation of interest in the contents of the audit report. It can be looked at in this way: Top management cannot afford the time required to read a lengthy report—it wants to know briefly *what was done* and *what were the results from doing it*—but section supervisors, the chief cost accountant, and the plant controller *are* interested in a more detailed account of the audit, not a wordy recital of every detail of the audit procedure but a concise statement of the records and procedures examined and of the audit findings for each cost function.

So we have a conflict of interests in the report. How are we to adequately serve all levels of management? By writing two reports —a brief account for top management and a more detailed statement for all other levels? We do not believe two reports are necessary. Instead, we write one report, but we do it in a manner that meets the requirements of all levels of management. In the introductory paragraph, we tell briefly the what, where, and when of the examination—what we examined, where we did it, and when we did it. Next we state in summary form the audit findings. We follow this with a brief description of any major exceptions or unsatisfactory conditions disclosed by the examination. We tell what was done about them. We do not tell only the unsatisfactory findings. We also try to give credit where it is due. For example, such things as evidence of good management or high morale are mentioned briefly at this point.

After this, we state with whom the scope and the results of the examination were reviewed at the location of the audit. Although this may have been mentioned in part in the description of major exceptions, we want top management to know that we reviewed *all* phases of the examination with the local management. The report to this point tells top management briefly what was done and what

were the results of doing it. In some reports, we are able to do this in one page. In others, it may require a page and a half. At all events, this part of the report is concise. Top management does not have to spend much time to get the essential facts. But we still have to properly serve the needs of all other levels of management. We do this by stating next, under appropriate captions, details of the scope of the examination and the audit findings.

Conclusion

In sum, it has been the mission of this paper, by giving the general setup of our internal audit of cost functions and detail in respect of the audit of standard costs, to make it clear why we think the internal audit of cost functions is important, how we undertake this audit, and how we acquaint management with what we did and what we found. In my opinion, the examination of cost functions offers the internal auditor his greatest opportunity to serve the needs of management. Or, to put it another way, if the internal auditing is to serve fully as a tool of management, the audit program *must* provide for the examination of cost functions.

COMING ARTICLES

In the *N. A. C. A. Bulletin*, August 15, 1949

The Cost Reports of a Greeting Card Manufacturer Operating Under Job and Standard Costs

by A. W. Acker

Job Order Cost Accounting Procedures for a Tag Manufacturer

by Thomas L. Evans

Controlling Job Costs in a Machine Shop

by H. A. Woosley

A CASE STUDY IN DELIVERY ROUTE COST COMPARISONS

by MERWIN P. CASS,
Resident Partner, Charles F. Rittenhouse & Co.
New York, N. Y.

This article offers the results, and some of the developmental background, of a study of the driver and helper, truck mileage, and overhead costs of maintaining delivery routes in a local service industry which is known to be highly competitive. These route costs are reviewed in relationship to route revenue, also developed for study. Clues afforded to several types of policy decisions are noted by the author.

DELIVERY costs are a frequently overlooked cost of operation. It is of interest that one section of the recent Hoover report brings up the subject with respect to government conduct of the postal industry and stresses particularly the age of the mail trucks. Too often management passes over delivery costs with a shrug of the shoulders, feeling that they are like air in a balloon and, if squeezed one place, will bulge in another. Nevertheless, there are facts that can be determined about delivery costs. Facts lead to intelligent control and expenses under control lead to increased profits.

This article presents and discusses an analysis and study of the delivery costs in a company in which route operating costs are an important factor. The completed studies gave the company's officials a worth-while sense of direction with respect to the following considerations:

1. Delivery areas which can be economically covered.
2. Distance from the base of operations at which an additional amount should be added to the sales price per unit in order to maintain the desired profit margin, competition permitting.
3. The minimum size of a customer's account which will return a profit.
4. Suggested areas for selective selling.
5. Comparison of delivery costs by type and make of truck and conditions under which each type and make might be

ANALYSIS AND COMPARISON OF ROUTE COSTS AND RELATIONSHIP TO REVENUE

	Driver and helper hours	Driver's pay	Payroll overhead	Supervisory	Mileage: Miles	Mileage: @	Mileage: Dollars	Total cost of delivery	Revenue	Per cent delivery cost to revenue
Monday										
Route A	12	$14.00	$ 7.00	$10.00	100	10¢	$10.00	$41.00	$200.00	20.5%
B	20	22.00	11.00	10.00	130	15	19.50	62.50	500.00	12.5
C	10	11.00	5.50	10.00	90	10	9.00	35.50	150.00	23.7
D	9	9.50	4.75	10.00	75	10	7.50	31.75	175.00	18.1
Tuesday										
Route B	20	22.00	11.00	10.00	130	15¢	19.50	62.50	450.00	13.9
D	10	11.00	5.50	10.00	80	10	8.00	34.50	180.00	19.2
E	11	12.50	6.25	10.00	100	10	10.00	38.75	125.00	31.0
F	12	14.00	7.00	10.00	150	10	15.00	46.00	200.00	23.0
Wednesday										
Route G	10	11.00	5.50	10.00	100	15¢	15.00	41.50	300.00	13.8

Etc.

Route A is a regular Monday trip.
Routes B and D are made every day or nearly so—Monday and Tuesday show above.
Route G is a Wednesday delivery, repeating on Friday.

EXHIBIT 1

effective—also the point at which accumulated repair costs warrant replacement.

Operating Conditions

To go back to the beginning and watch the building up of these results, we must first have an understanding of the company and its particular place in industry. Names and locations have been made deliberately misleading in the material which follows but the essential facts are kept reasonably accurate in spite of this and in spite of simplification of the illustrative data. The operating situation may be summarized as follows:

Name of company: Tow-Wyl-Wype Corp.
Located: In the center of an industrial hub, i.e., in a city surrounded by several other industrial areas.
Business: Industrial wiping towels—an economical rental service supplying especially woven wiping towels of uniform size in lieu of nondescript rags or waste previously used, in many cases, by the company's customers.
Competition: Keen and alert. The only way this particular company can exist and grow is by offering economical and intelligent service.
Requirements: Company must exchange clean wiping towels daily, weekly, or monthly, as may be necessary—for towels soiled by use since the prior delivery.
Delivery equipment: Several trucks, both large and small.

The laundering of the towels and related cost problems obviously are not involved in this particular study, although real problems are presented by processing operations. However, our attention is focussed upon the cost problems implicit in the delivery service characteristic of and, indeed, essential to this line of business.

Preparing and Displaying the Study of Route Revenue and Costs

Exhibit 1 contains all the basic information for the necessary study and was prepared in line with certain assumptions as to operating conditions. It was agreed that drivers' pay should be stable on a weekly basis. In comparable trades, there is a wide difference of opinion on the point of whether or not a driver should be on some form of incentive, an accountable hourly basis, or a weekly salary (or equivalent). In this case, truck routes had been planned prior to the study which provided, with minor variations, the neces-

sary hours required to maintain a constant level of pay at fifty hours per week, envisioned as five ten hour days.

It was also agreed that maintenance of the existing route summary records in the delivery department was appropriate. From them the following information was obtained for each route:

1. Driver
2. Route
3. Mileage
4. Truck number
5. Name of customer served
6. Quantity of towels delivered
7. Elapsed delivery time out of plant (delivery time within customers' plants was found to be relatively insignificant)

These route summary records were listed, studied, and grouped by identical or nearly identical routes for the period of approximately one month. The average quantity of towels delivered to each customer was determined. By applying the sales billing rate per towel, both the normal and actual income on individual routes and group of routes was obtained. (Weeks with holidays, unusual winter weather, and the like were dropped in the summarizing process, so far as proved possible.) Through this process, route revenue figures were obtained for the purpose of Exhibit 1.

A review of the cost columns of Exhibit 1 will disclose the information brought to the surface and displayed for route operation cost appraisal purposes. The first column shows route letter designation. The second, setting forth actual driver hours, reflects the fact that routes were planned to call for ten hours per day. The third column, driver's pay, assumes $1 per hour up to eight hours, and then $1.50 per hour. Payroll overhead, in the fourth column, is at the rate of 50 per cent of direct labor dollars. The categories of expense making up this overhead are:

	Cents per dollar of labor
Federal old age benefit tax	X
State unemployment tax	X
Federal unemployment tax	X
Compensation insurance premium	X
Allowance for vacation pay	X
Allowance for spare drivers	X
	50¢

The allowance for spare drivers is to cover the situation of illness of a regular driver and other comparable situations. Supervision appears in Exhibit 1 in the fifth column as allocation on a route basis of supervision salaries, delivery office salaries and share of rent. On the figures used, this is treated as $1,000 per month which, divided by number of routes-days per month (twenty working days, five routes) equals $10 per route per day. Mileage costs come next. They were calculated by individual trucks and cover depreciation, insurance, taxes, repairs, gas and oil. Tire cost, also a mileage cost, was calculated on an over-all basis because there were too many tire shifts between trucks for individual truck calculation of this item. Aggregate mileage costs of small trucks averaged out ten cents per mile and the large trucks at fifteen cents per mile. Actual mileage multiplied by these rates as applicable, gave truck mileage cost for each route.

The final step in the construction of Exhibit 1 was to cross total costs for each route and relate the respective totals, percentage wise, to route revenue determined as previously described.

What Will the Figures Tell?

The relative costs of operating in various delivery areas are pretty clearly indicated by the study. Route E on Tuesday has a delivery cost equal to 31 per cent of revenue. It can readily be determined that gross profits in this trade do not permit of such costs unless they are: (1) demanded by competition, (2) represent the costs of a new route just getting under way, or (3) reflect the fact that a regular customer's plant is on vacation or strike bound, cutting down normal revenue temporarily. The effect of distance from base of operations is also disclosed. Route F on Tuesday with a 23 per cent delivery cost and a mileage run of 150 miles appears to be in line for consideration for increased towel rental rates. A fifteen per cent increase in rates (possibly) would reduce the delivery cost ratio to 20 per cent of revenue.

Perhaps also some light can be shed on the minimum economical size of a customer's account. Obviously, there are two approaches. The first is by way of account analyses on a cash basis—cash received versus cash paid out. This can be an interesting study in itself. The second approach is on a profit and loss basis using the type of data here developed. In this case cost per account might be arrived at as driver's pay times 150 per cent (payroll overhead), plus one-fifteenth of $10, assuming driver can make fifteen

stops per day, plus the added mileage for the particular account at ten cents or fifteen cents per mile depending on truck size.

For example, assume a new account will add three miles to mileage driven and fifteen minutes (at overtime rates) to driver's pay.

Driver ¼ hour @	.385
Overhead fifty per cent	.192
Supervisory, office, etc.	.667
Mileage—3 miles @ 10¢	.300
Total delivery cost	1.544

If we assume that delivery costs must not exceed fifteen per cent, then, in this example, the new account must return approximately $10 of revenue per visit.

Areas for selective selling may well become apparent on the basis of the data which Exhibit 1 typifies. Again, Route E on Tuesday indicates that the time of a salesman along this route might add the necessary one or two accounts to increase the revenue to an adequate amount. Route C on Mondays may also need help. Intensive selling can mean real savings. If additional sales are not forthcoming, then the delivery supervisor must study his area for possible combinations of routes, substitution of a large truck for a small truck, less frequent deliveries or other practical remedy for subnormal results. Comparisons of costs by type and make of truck are a useful further development of truck mileage costs.

It may be noted that Route B on Monday and Tuesday uses a large truck. A helper is carried and larger but perhaps not more deliveries are made than on other routes. This truck can be used to advantage wherever the demand is adequate at equal or better delivery costs. Calculations can be made as to the effective number of towels that the large truck must carry to support its driver, helper, and added mileage costs.

Break-Even Charts for Checking on Route Operation

The assumption has been made that truck costs are mileage costs and hence are completely variable, whereas gasoline, oil, repairs, and tires—often about 60 per cent of truck costs—are the variable portion. The remainder, consisting of depreciation, insurance, taxes, and licenses may reasonably be called fixed. It may or may not be found that the economic life of a truck is more

accurately measured by mileage than by age. If mileage is the basic factor, the variable portion of truck costs is that much greater in the particular instance.

It is comparatively easy to prepare route break-even charts from the type of figures in Exhibit 1 and the company's regular monthly statements for manufacturing and other expenses which do not vary as between routes. Average delivery costs of the particular route as applicable over a range of sales volume and also a desired profit margin may be made use of in constructing such charts. By plotting on this graph the actual route costs of succeeding periods it can be seen very clearly which routes are:

1. Operating at less than average cost.
2. Operating at more than average cost and therefore consuming a portion of the desired profit margin.
3. Operating at a cost, not only above average, but using up all of the desired profit margin, some portion of which rightfully belongs to laundering or plant operations.

Analysis of truck costs against average may be especially helpful and may point to the ineffective truck and enable the intelligent solution of the question of replacement and, when this is desirable, the type or make of truck which would prove most economical for the particular route.

ORGANIZATION CHARTS FOR PERSONNEL CONTROL

We recently found that an organization chart can be used very effectively for a special purpose. Many companies are being faced with the necessity of reducing overhead and this cannot help but mean reduction of supervisory and clerical personnel. Our management has already had to face this problem and the accounting division was requested to supply the necessary data to show where the reductions might be made. Expenses were analyzed by departments and accounts, charts and graphs were prepared in various forms, and personnel was summarized by different classifications. With all of these reports, management still did not feel there was a satisfactory basis for determining where personnel reductions should be made.

Finally, we prepared detailed organization charts listing all employees on the office payrolls, including factory supervision. Weekly wage rates were converted to monthly wage rates and the monthly rate of each employee was entered on the charts. We then arrived at the total number of employees and the total monthly salaries for each department and each division. Our final organization chart contained all divisions and included only the departmental name, total number of employees, and the total monthly salaries for each department. These charts proved to be just the guide for which management was looking. *(H. E. Kuehl, Cedar Rapids)*

POINTS OF VIEW

The problem is not one of finding new methods of recording costs. The problem is to establish an index for converting costs as recorded to a new measurement of income. Then the question must be asked. "Who is going to set the new index and on what is it to be predicated?" When the index problem is solved, the measurement of income will be solved. *(J. Fred Maffett, Chattanooga)*

* * *

Repair and maintenance costs are a major element of total cost in any manufacturing company. In spite of this fact, too often the control of these costs is nonexistent or, at best, haphazard. (Arthur Rice, Birmingham)

* * *

There should be clarification of accounting procedures so that the methods acceptable to the Bureau of Internal Revenue for tax purposes will be permitted for profit limitation computations, to avoid duplication in accounting and consequent increase in manpower and red tape. *(J. M. Naab, Paterson)*

* * *

At best, arriving at equipment life expectancy is sophisticated guessing. (Doren D. Vest, Washington)

* * *

The primary object in any centralization program should naturally be reduction in operating costs, but careful consideration is absolutely necessary in order to be able to forecast that the business will be carried on successfully after the eliminations that go with the centralization program have been effected. *(William F. Hoerner, New Orleans)*

* * *

The insurance responsibility of the controller is a substantial one and should not be lightly undertaken. Stockholders and creditors have a right to feel that all insurable risks of the company are adequately covered at all times at the lowest possible cost. (Horace S. Gordon, New Haven)

* * *

The practical workings of the three currently approved types of government contracts prove that the old "cost plus a percentage of cost" concept survives, aand that the more the contractor spends, the greater his profit is likely to be. Many persons believe that more effective results could be attained through this type of contract than through the newer contract forms. *(N. Madison Cartmell, New York)*

CONTINUING EXPENSE ESTIMATES AND BUSINESS INTERRUPTION INSURANCE COVERAGE

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This paper is directed principally to the question of the proper approach to the determination of amounts to be included in stated coverage under business interruption insurance for the element of continuing costs and expenses. The author proposes a careful advance determination of the most likely effect of fire on subsequent operations. Considerations put forward as important include the time which replacement of damage will probably require and the degree of suspension of operations which seems to be indicated by the company's particular situation.

BUSINESS interruption insurance or use and occupancy insurance, as it is frequently termed, is materially different in several respects from insurance on a building or stock. The amount of insurance to be carried upon any physical property is generally governed by its sound replacement value. That to be carried on stock can, if quantities are known, be determined from market values. Therefore, the owner of a business can state within fairly close limits what insurance coverage is required to replace the loss of the fixed assets used in his business or the loss of his inventories. However, the amount of business interruption insurance required for any business does not lend itself so readily to determination because no two businesses, even though engaged in the same field, have the same operating and overhead costs, nor are their profits always or even usually comparable.

The one thing common to all policies of business interruption insurance regardless of the forms under which they may be written, is time. Business interruption insurance is intended to do one thing and, if purchased properly, it will do that one thing well. It will replace the value to the company of the production time lost by the business in reconstruction of facilities destroyed by fire. Collectible losses under these policies are expressed in amounts of lost profits and in continuing fixed charges and other expenses but the element governing how much, if any, money is to be collected is the time for which operations or normal earnings are suspended.

Types of Business Interruption Coverage

The form under which the business interruption policy is to be written is worthy of more attention than it ordinarily received. The forms in general use may be divided into three major divisions: gross earnings, specified time, and the contribution form. The gross earnings form is intended for small businesses having little expense other than that directly connected with the cost of goods or services. The specified time form, which means exactly that, insures for an agreed percentage of 365 calendar days. This type of coverage is primarily intended for mercantile and non-manufacuring risks, the facilities of which can be replaced in a comparatively short time, or for those risks whose earnings are seasonal. The percentage of contribution form is primarily intended for manufacturing plants and service industries where fire may involve curtailment of operation for any period of from one day to one year. Variations of either the specified time or contribution form may be obtained for any mercantile, service, or manufacturing business.

Meaning of the "Average" Clause

As a general rule, the manufacturing, jobbing, or mercantile firm will find either the *specified time form* or a variation of *the percentage of contribution form* best suited to its needs. In these forms, the policy of business interruption insurance is intended to protect the assured against the loss of profits and the outlay for expenses continuing during partial or total suspension of normal operations. However, it will protect him only to the extent that he has sufficient insurance in force at the time the interruption occurs. It is not unusual for an assured to violate the terms of the average clause contained in his policies and to be unaware of the violation until after a fire occurs when the adjuster directs his attention to the violation and applies a penalty against him.

An application of the average clause can be illustrated by the case of a business having earnings of $100,000 a year and an estimated $100,000 of annual expenses of the type which will continue during a period of temporary suspension of manufacturing activities. This business would require $200,000 of insurance and, if its policies contained a 100% average clause (meaning that the assured contracts to insure all of his profits and continuing expenses at their total annual value), all losses sustained as the result of suspended operations would be reimbursed to it.

In the event that the entire facilities of the business could be

replaced within a six-month period and assuming that the profits are earned at a regular rate throughout the year, this business should insure its profits and expenses for $100,000, subject to a fifty per cent average clause. This means that the insurance underwriter will, in this case, pay the first $100,000 of loss arising from suspension of operations as the result of any fire. Since, in the example, the profits are earned at a regular rate and the facilities can be replaced within six months, the effect of the fifty per cent average clause is to insure the first six months of loss. Assuming further that this business insures for only $150,000 with a 100 per cent average clause or for $75,000 under the 50 per cent contribution form, the underwriters will compare the annual value of the profits and expenses insured, $200,000 to the total of insurance in force, $150,000, (insurance in force under the fifty per cent contribution form will, of course, be multiplied by two in order to place it on an annual basis), and will pay the assured only one hundred fifty/two hundredths or 75 per cent of each dollar of loss sustained.

Hazards of Estimating Continuing Costs on Shut-Down Basis

In a considerable majority of cases in which a penalty is applied for insufficient insurance in force when compared to values at risk, the fault or error originates in a lack of understanding of what is meant by the phrase "such costs and expenses as must necessarily continue during total or partial suspension of operations." In some instances the businessman errs at the time the insurance was purchased. He and the insurance agent may have based their calculations of the amount of insurance required to cover continuing costs and expenses upon complete shutdown of the plant for an extended period of time and may, therefore, have included as the value of continuing costs and expenses only those costs specified by name in the form being considered at the time the policy was purchased and, of these expenses, only the part estimated as continuing during complete shutdown.

No two businesses are affected in the same manner by a suspension of operations. Generally, however, where total suspension is of comparatively short duration, many operating expenses which are not ordinarily considered as necessary during total suspension are not discontinued because they cannot be stopped immediately. As a matter of fact, it probably costs less to continue them for a short time than it would cost to resume them after discontinuance.

Illustrations of the type of expense frequently not included in values at the time a policy is purchased or in the amount of coverage thus decided upon, are the cost of trunk telephone lines, where a number are in use, and the running expenses of the accounting or collection departments. Obviously, these costs would not continue during a lengthy period of total suspension. It is just as obvious that they cannot be discontinued immediately the plant is closed down. Naturally, the assured, having a belief that the policy is intended to place him in the financial position he would have occupied had no fire occurred, expects recovery of the expenses. However, if the cost in question is not included in the total values covered by the insurance in force at the time of a fire, it can hardly be recovered as a continuing cost.

Income Deemed Earned on Production Basis

In any discussion of profits insured under business interruption forms, it should be borne in mind at all times that, for the purpose of determining the loss sustained under business interruption insurance in a manufacturing plant, it is presumed that the profits, subject to deduction of miscellaneous sales expenses, are earned at the moment production is completed and not when sale of the product is made. This has a material bearing upon the type of insurance to be written, particularly in those businesses in which production is condensed into a short period although sales are made throughout the year. An extreme illustration of this type of business is that of a plant engaged in dehydrating fruits. Ordinarily these operations do not require elaborate structures and such structures are used for production for only from three to six months during a twelve-month period.

Precoverage Survey of Physical Properties

Before determining the type and amount of business interruption insurance to be carried, management should review the physical properties in which the business is being conducted, first, for the purpose of determining the departments most susceptible to fire, and, second, for the purpose of estimating the extent of the fire hazard and the departments or buildings most likely to be affected before the fire can be stopped.

In connection with the survey of the physical properties and the hazards at risk, the management should prepare or obtain an estimate of the time required to replace the facilities of each unit of

the business. This estimate need not, of course, be made in detail, but a reasonable estimate of replacement time is extremely important since a settlement in the event of loss will be made upon the length of time required to replace the facilities destroyed by fire. It would seem to be unnecessary for any business to insure its profits for a twelve months period under a 100 per cent average clause if the maximum time required to replace the facilities is only from six to seven months. The length of time required to replace facilities destroyed by fire will, therefore, in the majority of cases determine the percentage of contribution and will influence the amount of business interruption insurance to be carried. After a survey of physical properties has been completed, the management and the company's accountant should segregate the operation into departments or manufacturing divisions in order to estimate the effect of the loss of the production of those divisions most likely to be destroyed upon production of the other departments or divisions of the plant and upon the production of the plant as a whole.

Budgeting to Get the Picture of Continuing Costs.

With a picture of the hazards and departmental profits or production in his mind, the prospective purchaser is ready to estimate the amount of business interruption insurance required to protect his business. In order to make an estimate that will be better than an informed guess, he will require the assistance of his accounting department for the preparation of a budget.

The preparation of a budget upon which to base the business interruption insurance requirements of any plant or business is no different from any other budget of anticipated performance. I prefer to start with a listing of all of the company's operating accounts in columnar form on which appears the company's experience for the three months immediately preceding the date as of which the budget is to be made, as well as for the twelve month period prior to that date. The purpose of having a trial balance of operating accounts for a three as well as for a twelve months period, as budget background, is to emphasize material changes as well as nonrecurring income or expense which might otherwise be overlooked. The mechanics of preparing the budget involve reviews of sales realization, of production quantities and costs, as well as each of the items included in selling, administrative, and financial expense, and are the same for this budget as for any other. It will be well to allow provision on the form used for the

budget for columns in which adjustments can be made. These will be required in order to reduce the estimated expenses of manufacturing, selling, administration, etc., to the amounts which can be expected to continue in the event of a fire. This estimate represents the items to be included in the total value of the policy as continuing costs and expenses. The possible penalties of underestimating this amount have been touched on earlier.

What Will the Fire Do?

During the course of his preparation of the estimate of insurable values, the prospective purchaser must make the most important estimate of all. What kind of a fire am I going to have if one occurs? By kind of fire, little reference is intended to the size of the fire. In the case of a sawmill, for instance, a fire which destroys only the dry kilns, while major in proportion, need not result in material loss when compared to the over-all operation since the assured can have this service performed outside his plant. The loss resulting from destruction of the dry kiln will be measured by the difference in cost of the outside services and the normal cost of operating the dry kiln department. If the assured is unable to obtain the service from sources outside his plant, the loss will be measured by the difference in sales realization between green and kiln-dried lumber. On the other hand, a fire in the fuel bins of a sawmill, while not a major conflagration, will shut down the entire operation because the waste cannot be taken away from the machines.

In neither of these illustrations is the assured able to discontinue any other than a negligible portion of his administrative or overhead expense. On the other hand, a fire which destroys the facilities of the lumber storage yard, while not affecting production directly, will frequently result in a marked reduction in administrative costs (which category contains most of the continuing expenses) until the inventory is replaced.

Taking All Features of the Post-Fire Situation Into Account

Ordinary payroll, which term usually includes the pay of all employees other than those under contract and department heads, may be insured for a maximum amount per day for a limited time. If the major risk relates to comparatively small fires, the prospective purchaser will find that—with the exception of ordinary labor especially covered as above-mentioned, manufacturing supplies,

and those expenses directly related to manufacturing and sales—there are very few costs for which he does not require insurance. If the clerical labor carried on the office payroll is not included with ordinary labor as a separate item in the policy, it will be necessary to include practically all of the office personnel in the category of necessary employees if there is reason to expect they will be retained for any period after a fire.

It should be borne in mind that any item of expense not continued during a shutdown period for the express purpose of reducing the loss must, if the assured expects to collect for it as a reduction of his profits, be included with the insurance in force at its annual value. An illustration of an expense item commonly excluded from insurable values at the time a policy is written is the bookkeeping and stenographic staff. Under most conditions other than complete destruction of all of the properties, the services of the members of the office staff are required for periods ranging from one week to several months. If the assured expects to collect any portion of the salaries paid, as a reduction of earnings, he must include the annual value of those salaries in the total values of his business interruption insurance coverage.

In the event that any fire is likely to destroy the entire plant, the problem of the prospective purchaser of business interruption insurance is simplified. He need only insure those items of cost that will continue beyond the date of the fire plus depreciation on the properties destroyed. However, he must insure all items on which there could be a possible claim for reimbursement under the policies.

Quite frequently, a business man includes with necessary employees only the department heads and various key personnel. When a fire occurs, particularly when only a portion of a plant has been burned, he finds that the salaried persons which had been considered as the only ones necessary for continuance of operations include "too many chiefs and not enough Indians". He finds it necessary to continue many employees who are necessary to carrying on the work in progress at the time the fire occurred. This condition also occurs in regard to other expenses not ordinarily considered as continuing. We are all familiar with the expenses ordinarily thought of as continuing. These include property taxes, depreciation, the amortization of insurance premiums, and like items. When discussing continuing expenses to be included with values under business interruption insurance, we are not talking about an

academic question. We should mean all expenses, other than those entering directly into the costs of goods sold or specifically excluded from the coverage, which could reasonably be expected to be incurred during a temporary or partial shutdown of the business.

Costs Incurred to Reduce Loss

After any fire has occurred, it is desirable to maintain separate accounts for the costs of goods or services obtained from outside sources for replacement of departmental production. It is imperative that separate cost records be maintained of expenses incurred for the purpose of reducing the period of suspension. An illustration of this type of expense is the penalty cost of overtime labor on construction. A job requiring three thousand man hours will take thirty-seven and one-half days for ten men working eight hours each day. If the time can be reduced by the use of overtime labor, the period of suspension is also reduced and that portion of the payrolls representing premium pay will be reimbursed to the assured as an expense incurred to reduce the loss. This type of expense is frequently termed an expediting cost. I have been informed that expenses of this nature are not subject to penalty in those instances in which an insufficient amount of insurance is in effect at the time of a fire.

Conclusion

In preparing an estimate of insurable values for business interruption insurance purposes two things are of primary importance: first, a survey of the plant for the purpose of estimating the risk by departments and the time required for replacement of the facilities and, second, an estimate of insurable values based upon that risk involving the shortest period of suspension.

Business interruption insurance policies should be reviewed at regular intervals because the policy which represents proper coverage today may provide excessive or insufficient coverage six or even three months hence. Each business represents a separate problem which can best be dealt with by the persons in that business in collaboration with their respective insurance agents or brokers. The businessman interested in obtaining business interruption insurance should bear in mind, when considering the amount of insurance to be purchased, that he is insuring the profits and expenses of the business measured in terms of time.

JOB FACTORS FOR THE EVALUATION OF CLERICAL AND ADMINISTRATIVE POSITIONS

by JOHN B. HUGHES,
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Distinguishing four principal rating factors, involving some twenty component factors, the author of this article sets forth the initial steps of a job evaluation application in his company under which all salaried positions—from top to bottom—are point-rated against the scale which gradations of these components provides. The presentation embodies a brief description of each component, indication of its application, and the maximum points available for it in the value scale.

OVER the last decade, progressive management has more and more come to use job evaluation methods for determining the wages to be paid the hourly-rated employees. However, until very recent years most industrial executives have been content to control the salary program for administrative personnel without the application of procedures incorporating job evaluation techniques. It is implicit in this situation that, while the structure of job evaluation systems for industrial workers has become comparatively well-defined, techniques applicable to salary determination have not been developed to the same degree of refinement and standardization.

The Six Steps of Job Evaluation

The formulation of job evaluation plans, whether for wage or salary administration, necessarily follows a more or less basic pattern of development. First, the method of job rating must be selected. Pilot studies of several commonly used evaluation systems must be conducted to determine whether nonquantitative measures, such as job ranking and classification, or quantitative measures incorporating point-rating methods or factor comparison, will provide the more effective framework within which to operate the program. The second step involves the development and refinement of factors or grades upon which job measurements are to be based and the determination of the various degrees within each factor or grade. Job analysis comprises the third step of the pro-

EVALUATION CHART FOR FACTORS AND COMPONENTS

Factors	*Components*		*Point Potentials*
I. Skill			
(500)	A. Acquired knowledge and training		100
	B. Work experience		200
	C. Complexity of work:		
	Supervision received	50	
	Mental resourcefulness	40	
	Accuracy; effect of errors	40	
	Manual dexterity	20	150
	D. Judgment—decisions		50
II. Responsibility			
(375)	A. Supervision:		
	Factory	65	
	Administrative	50	
	Functional	35	150
	B. Company property		50
	C. Material and product		60
	D. Records		35
	E. Methods and procedures		40
	F. Personal contacts		40
III. Effort			
(75)	A. Mental and visual demand		40
	B. Physical demand		35
IV. Working conditions			
(50)	A. Working environment		25
	B. Exposure to hazards		25
	Maximum potential:		1,000

EXHIBIT 1

cedure. The effectiveness and defensibility of any rating plan depends upon the narrative writing of each job description to reveal the qualifications, responsibility, and degree of difficulty inherent in the duties assumed by the incumbent. The remaining three steps of the complete program may be summarized as the plotting of "scatter diagrams" to develop the wage curve, application of local wage surveys, and the incorporation of merit rating methods into the plan.

In projecting these steps of development of salary administration, the most complex and difficult phases of job evaluation technique become readily apparent. These are the first two given above, i.e., the selection of a rating system best suited for evaluation of administrative positions and the basis upon which measurement factors are to be developed.

An Assignment to Build a Salaried Job Evaluation Program

These questions confronted the author and fellow members of the job evaluation committee appointed by management to develop a salary administration manual applicable to the salaried employees of Lake Shore Tire & Rubber Company. The company manufactures a variety of rubber tires for passenger automobiles, trucks, farm implements, and other vehicles. Employees in the administrative category are classified generally as clerical, technical, and supervisory personnel below management levels, and represent a wide diversity of organizational functions which include production, engineering, research, maintenance, accounting, business administration, and traffic. Sales positions were excluded from the program.

The first problem of the committee involved the selection of a system which would provide clearly-defined differentials among a variety of positions and grades. This approach—the endeavor to find a broad background of values against which to portray job differentiation—was in some disagreement with the theory that administrative positions in one general classification such as clerical personnel should be evaluated by factors which are pertinent only to that group. However, it was concluded, after several basic systems had been tested by pilot studies, that a single comprehensive manual descriptive of all salaried jobs should be set up and that, in addition, the system should incorporate quantitative measurement of jobs over the whole scale, i.e., point rating.

The point rating scale used conjunctively with factor comparison methods was selected as the best means of evaluation to achieve a specificity between grade classifications which job ranking alone would not afford. While this method cannot be termed scientific measurement after the manner of mathematically derived results, it does provide a procedure for recording estimates of job content as accurate and objective as is possible when dealing with human relationships.

Adoption of the point rating method presented the difficult task of developing factors and factor descriptions upon which to base evaluation. A number of potential factors were analyzed to determine which elements are present in the duties of company administrative positions. By process of elimination, all factors which were considered to be overlapping, nonapplicable, or superfluous were discarded. Job factors selected were then substantiated and defined in clear and definite terms. The maximum and minimum content of each factor was determined by analysis of positions containing the lowest and highest degree, respectively, of each factor. Intermediate levels were then established, the number of degrees ranging from four to six with the exception of those for one factor —work experience—which was given fifteen levels of progression.

Salaried Job Evaluation Factors

Factors and factor descriptions selected as the final basis for the evaluation of company administrative positions are presented in the following paragraphs. It should be recognized that the factors listed are not applicable to all manufacturing organizations and that any evaluation technique must be carefully adapted to the functions of the individual company. However, these factors as outlined will provide a working example of measurement scales which accomplish the general objective of job evaluation through the grouping of similar jobs in the same classification and salary range despite the wide diversity of duties assumed by employees in administrative categories.

The summary factors recognized in the plan developed, and the components of each, are arranged in Exhibit 1 in which the relative maximum points for the individual components are given. In the remainder of this paper, an attempt is made to indicate the character of the degree range provided for in respect of each component and, likewise, the types of positions falling at the top and bottom—and sometimes over the course—of these ranges. In Exhibit 2, the specific gradations of one of the components is spelt out to serve as an example.

Before proceeding to the description of the components, it may assist in keeping this discussion on a certain level of simplicity to note that the job factors, themselves, are only four in number—skill, responsibility, effort, and working conditions—and that positions may rate up to 500 points in skill required, 375 points in responsibility carried, 75 points in respect of effort called for,

EVALUATION FACTOR NO. I

ACQUIRED KNOWLEDGE AND TRAINING

Degree	*Requirements of the Position*	*Point Values*
1.	Requires knowledge of general arithmetic, ability to prepare or type simple routine reports and correspondence, or ability to perform simple office functions under direct supervision. *Equivalent education:* High school graduate.	30
2.	Requires knowledge of advanced commercial science, operation of business machines or other equipment, or practical working knowledge of general principles in a minor professional or technical field. *Equivalent education:* High school graduate with six months to one year of specialized training in an accredited business, technical, or vocational school.	42
3.	Requires an acquaintance with basic fundamentals in a major professional or technical field, or a thorough knowledge of general principles in a minor professional or technical field. *Equivalent education:* High school graduate with two years of college or university training in a specialized field.	54
4.	Requires a practical working knowledge of advanced principles in a major professional or technical field, plus a related background in general education. *Equivalent education:* College or university graduate with a degree in a specialized field.	82
5.	Requires a thorough and complete knowledge of advanced principles in a major professional or technical field involving independent research and creative work. *Equivalent education:* College or university graduate with a master's degree or at least one year's equivalent in graduate work in a specialized field.	100

EXHIBIT 2

and 50 points for severity of working conditions to which the position may be subject.

Components of the Skill Factor

Acquired knowledge and training—This component is a measure of the acquired knowledge and training necessary for the successful performance of the duties of particular jobs. As formal education and training are considered fundamental in developing the necessary background and bringing out the required degree of exercise of intelligence, this factor is determined in terms of equivalent schooling. Development of the five degrees or levels discerned is illustrated in Exhibit 2. It will be noted that the minimum educational requirement for administrative personnel as indicated in the first degree of this factor is high school graduation or equivalent. This scale will therefore provide a basis for rating

all types of salaried positions, from clerical positions requiring minimum educational qualifications to those demanding a very high degree of scholastic background, such as research chemist or engineering specialist.

In the wording of the factor descriptions shown, any science which constitutes a subject for which a college or university degree may be conferred constitutes a "major professional or technical field." Such sciences include chemistry, engineering, higher accountancy, and business administration. A "minor professional or technical field" refers to a science which does not commonly constitute a subject for college major or university degree, such as commercial science, drafting, bookkeeping, and laboratory practice.

Work experience—This component measures the requirement for practical knowledge acquired during the course of a person's working experience including that which must be acquired as a prerequisite to appointment as well as that which must be acquired after appointment to the position (including knowledge of company policies, methods, and procedures). Increasing degrees for this factor were established on the basis of time required to attain the necessary work experience. Minimum credit under this factor is given to positions where one week's experience or less is required in the position with no previous experience necessary, such as messengers, file clerks, and minor clerical personnel. Maximum credit is given to positions where extensive experience—fifteen years or above—in diversified and progressively important positions or with an outside organization, is necessary to acquire thorough and over-all knowledge. This top degree is applicable to such positions as production manager.

Character of supervision received—This component measures the degree of supervision received from the immediate superior or higher authority in connection with the accomplishment of assigned work or, to state it inversely, the extent to which the incumbent must proceed "on his own." Five increasing degrees are established for the respective supervisory levels under standard designations as follows: (1) immediate supervision, (2) supervision, (3) general supervision, (4) direction, and (5) general direction. Factor descriptions are developed in the degree to which the immediate supervisor outlines the courses of action to be followed, reviews performance and progress, checks completed work assign-

ments or results, and handles out-of-the-ordinary phases of the work. Thus, grades range from positions where the work is accomplished in accordance with detailed instructions from the immediate supervisor to highly specialized positions where the work is accomplished with little or no reference to higher authority.

Mental resourcefulness—This component may be defined as the extent to which the position requires original thinking (initiative, resourcefulness, and creativeness) in the accomplishment of assigned work. The factor measures the degree of skill required to fulfill the duties of the position as indicated by the existence of established routines, standard practice, and other organizational guide lines. Consideration is given to the need for expediency, aggressiveness, and ability to reach out into "unexplored areas." Five progressive degrees under this factor range from positions where the assigned work is of a nature which requires application of clearly prescribed practices with little or no opportunity to exercise independent action, to positions where the duties require outstanding ability and aggressiveness to meet new and constantly changing conditions, devise expedients, and project the application of specialized technical knowledge to involved and complex functions. It should perhaps be commented that this factor does not overlap credit given for judgment or responsibility since a high degree of original thinking or creative ability may be required in certain positions where credit for the judgment or responsibility factor is comparatively unimportant.

Accuracy; effect of errors in detail—This component may be defined as the degree of accuracy with which detail work must be performed plus the likelihood of errors occurring and the relative seriousness of inaccuracies from the standpoint of customer relations, disruption of work routines, etc. "Detail" refers to procedures such as calculating, posting, testing, checking, instructing, and similar functions. "Inaccuracies" refer to errors of commission or omission and should not be construed as inaccuracy in judgment. Five degrees under this factor range from positions where the possibility of errors in detail is negligible and of little consequence, to positions where the work is not subject to verification and duties require exacting accuracy of detail involving data or processes on which top management bases major decisions.

Manual dexterity—This component may be defined as the application of natural or acquired physical ability necessary to perform properly all manual duties of the position, with specific reference to mechanical dexterity, sensory discrimination, or visual perception. Consideration is given to speed, accuracy, and reaction time plus the time required to develop the necessary degree of dexterity. Weighted credit is given to certain clerical positions which must be recognized because of mechanical skill required in typing, operating office machines, or repetitive manual operations where fast reaction time is a definite element. Four progressive degrees range from positions requiring ability to accomplish simple manual operations on office machines or laboratory devices at reasonable speed, to positions requiring ability to operate office machines or laboratory devices of a highly complex nature involving a high degree of coordination and extremely fast reaction time.

Judgment—The judgment component measures the relative importance of the position with respect to the difficulty or complexity of decisions and the extent to which independent judgment must be exercised beyond the confines of organizational limitations such as precedent, established practice, or formulated instructions. In evaluating a position under the five degrees of this factor, it is important to determine the limits imposed by higher authority over the incumbent for deciding upon independent courses of action without reference to or advice from a superior or higher authority. Judgment levels range from positions where there is little or no opportunity for making decisions or taking independent action, to positions where difficult and unprecedented decisions are the predominant characteristic of the position and where results of independent action are not easily predicted.

Components of the Responsibility Factor

Responsibility for supervision—This component may be defined as the responsibility that management delegates to the incumbent for directing, planning, checking, and controlling the work and conduct of subordinate employees to secure the most efficient utilization of their time and effort. In general, this factor evaluates the nature or type of supervision exercised and takes into consideration the relative supervisory responsibility for accomplishment of work objectives. Three elements used to determine the scope of supervision exercised are:

1. Supervision over factory personnel
2. Supervision over administrative personnel
3. Functional supervision

Supervision of administrative groups refers to direct line authority involving close supervision over a specific number of employees, and indirect line authority relating to supervision within a department or delegated from top management through the department heads. Credit is based on the degree to which the incumbent is responsible for training and placement of personnel, the assignment of work, the maintenance of performance standards and discipline, the handling of difficult or exceptional work problems referred to him by subordinates, and accountability for errors made by employees under his supervision. In the above supervisory classifications, consideration is given to the number and class of personnel supervised.

Functional supervision refers to responsibility for supervising general administration of company policies relating to perfomance, conduct, and welfare of employees in one or both of the major plant divisions, i.e. factory and administrative. This factor is an indirect supervisory function of staff authority and should be clearly distinguished from direct or indirect line supervision as defined on the company organization chart.

Responsibility for company property—This component measures the degree of care or attention required to prevent damage or loss of tangible company property and applies primarily to responsibility for machinery and equipment assumed by production and maintenance supervisors. Also evaluated under this factor are such job elements as responsibility for cash funds, valuable papers, office fixtures, and security measures involving fire prevention or protection of company property against theft or trespass.

Five progressive degrees of this factor range from positions where the incumbent is responsible for not more than personal usage of office desks and machines, simple laboratory devices, and related fixtures, to positions where duties require high skill and continuous attention to prevent serious damage or great loss due to mechanical failure of vital machinery and equipment.

Responsibility for material and product—This component measures the degree of responsibility assumed by the incumbent for the selection, procurement, and release of materials, the development

of compounds, designs, or processes, and control of operations which directly or indirectly affect the final form and quality of the manufactured product. Credit is based also on the relative importance of responsibility for quality, form, or analysis of raw materials and materials in process plus the degree of attention required to avoid defective or scrap material.

The five degrees under this factor range from positions of an attendant nature where the incumbent may assist specialists by performing routine laboratory functions, to positions where major responsibility is assumed by the incumbent for quality, form, or analysis of material and product, demanding extreme care to prevent material losses or defective products. Thus the first degree would be applicable to a closely-supervised laboratory assistant who analyzes raw materials by chemical tests and records technical data for control purposes. The fifth and highest degree would apply to the position of supervisor of products development, where the incumbent is responsible for selecting materials, consistent with quality standards, to be placed in production, developing designs and specifications or product components, and recommending specific techniques to be followed in manufacturing operations.

Responsibility for records and reports—This component may be defined as the responsibility that management places on the incumbent for the compilation and analysis of essential administrative data. Credit is based on the degree of skill and precision required to compile data, the importance of such records and reports to related administrative functions, and the time element involved in preparation.

The first degree of this factor would be applicable to minor clerical positions where the incumbent is responsible for preparing simple records and reports which are well routinized and not subject to time schedules. In such positions recorded data may be supplementary to primary functions of the job and may not require particular precision in preparation. The maximum degree of this factor would be applied to such positions as that of cost supervisor where the incumbent is responsible for records and reports which are highly complex in nature and subject to strict time schedules and the preparation and analysis of which require a high degree of coordinated effort among employees of various skills.

Responsibility for methods and procedures—This component measures responsibility for the positive accountability of "getting

things done" in the most efficient manner, particularly, as it affects the work of other employees. Consideration is given to the complexity of methods and procedures involved plus the effect and scope of results on operating functions in the incumbent's own department, in other departments, or in phases of activity which affect the work of one or more administrative departments. Five degrees under this factor range from positions where the incumbent is not responsible for devising methods and procedures in connection with his work, other than minor routines, to such positions as that of the production manager who is responsible for development and application of diversified methods and procedures of a highly technical nature.

Responsibility for personal contacts—This component measures the extent and relative importance of the incumbent's personal contacts with other employees or with individuals outside the company and the effect of these contacts on plant operating efficiency or employee and public relations. Responsibility for confidential matters is consolidated in this factor component as it is recognized that both elements represent a related basis for evaluation. Recognition is given to the type of personality required, the need for discretion and integrity, and the tact and diplomacy necessary to assure harmonious relations.

Five degrees of this factor range from positions where only elemental employee relation is required to such positions as industrial relations manager where the incumbent must handle contacts within the company or outside the organization involving important agreements or disposal of personnel matters which could greatly affect company good will.

Components of the Effort Factor

Mental and visual demand—This component measures the extent to which the mental processes are taxed by work concentration and the degree of eye strain, monotony of routine, or nervous energy regularly associated with the duties of the position. Credit is based on the degree of mental and visual concentration required on close details, pace at which the incumbent must accomplish his work, and the extent to which interruptions distract the trend of thought from one phase of job detail to another.

The first degree of this factor would apply to positions where mental concentration is not an essential part of the work and the

diversity of duties is such as to arouse interest. The fifth and highest degree is applicable to positions which require exacting mental alertness where numerous interruptions are normal routine and demand much concentration and nervous strain to accomplish work of a very complex nature.

Physical effort—This component measures the amount of physical exertion required to fulfill the duties of the position and the per cent of time this effort is sustained. Credit for evaluation is based on the degree of continuous performance involving manual tasks without benefit of interruption or breathing spells. Five degrees of this factor range from such physical activities as light clerical and technical work performed while seated, to manual tasks which involve strenuous physical exertion, such as the manual handling of heavy equipment or materials.

Where the duties of a position vary with respect to the amount of physical effort required, the per cent of time which the incumbent normally engages on each task is estimated. Each task is then rated separately under the proper degree and the respective points added to secure total credit for the factor. Thus, in the case of a clerical employee, evaluation procedure to determine physical effort may be formulated as follows:

Description	*Work level*	*Per cent of time*	*Points*
Light clerical work performed while sitting at desk..	A	60	6
Performs light manual operations while seated (typing)	B	30	5
Operates mimeograph machine	C	10	5
Point rating			16

Components of the Working Conditions Factor

Working environment—This component measures credit due the position for disagreeable physical surroundings and work environment. Consideration is given to those elements which contribute unfavorable conditions to the performance of the job such as extreme heat, illumination, machine noise, atmosphere, and ventilation. Four degrees of this factor provide a clearly-defined differential between positions where the incumbent works regularly under desirable conditions and such positions as power house supervisor where the incumbent works in immediate proximity to machine noise of an intense degree.

Exposure to hazards—This component measures the possibility of personal injury to which the incumbent is exposed during the

course of his work. Weighted credit is given to those positions where hazards to personal safety are recognized as an element of the job or where the incumbent works within close proximity to hazardous machinery or processes. This factor distinguishes between positions where the possibility of injury is remote, to such positions as electrical engineer where the work involves constant hazards, and alertness is required to avoid injury.

Conclusion

As pointed out earlier, the factors, their components, and the rating scale were devised for direct applicability to each and every position in the company falling in the salaried or clerical and administrative category, despite the wide variation in requirements of such posts—wider than is ordinarily found among jobs in productive categories. As also indicated, many might question this approach and might advance the line of argument that types of positions have been worked into our single scale which should be rated in detail on entirely separate bases and later brought into the broad company scheme. This viewpoint can be justified. However, our procedure is simpler of operation and offers, in the end, a clearer picture of relationships over the whole range of salaried jobs. In a word, if evaluation of these positions can practicably be constructed on the basis of a single scale, it should be. We feel we have attained practicability in this direction.

RETENTION OF RECORDS

One problem which plagues most companies is the retention of records. Our company has devised an unique method of handling accounts payable vouchers which greatly simplifies the problem for this particular item. Our method permits us to destroy these vouchers without fingering through the entire file to segregate them, by providing a separate number series according to retention requirements. Vouchers are numbered in three series:

1 to 1000. This series covers vouchers which we desire to retain permanently. It includes charges to inventory, fixed assets, taxes, insurance, etc.

1001 to 2000. This series covers expense vouchers, such as stationery and office supplies, printing, expense reports, maintenance supplies, etc.

2001 to 3000. This series covers all incoming freight vouchers. Incidentally, we send the freight bills out of the plant for audit, so it is a simple matter to gather up all the 2000 series vouchers each month for this purpose. (*Nathan Fine, Detroit*)